NOTES.

By the death of Lord Tennyson not only does England lose one of her noblest sons, but the world loses the Poet who, above all others who have ever lived, combined the love and knowledge of Nature with the unceasing study of the causes of things and of Nature's laws. When from this point of view we compare him with his forerunners, Dante is the only one it is needful to name; but although Dante's knowledge was well abreast of his time, he lacked the fulness of Tennyson, for the reason that in his day science was restricted within narrow limits. It is right and fitting that the highest poetry should be associated with the highest knowledge, and in the study of science, as Tennyson has shown us, we have one of the necessary bases of the fullest poetry—a poetry which appeals at the same time to the deepest emotions and the highest and broadest intellects of mankind. Tennyson, in short, has shown that science and poetry, so far from being antagonistic, must for ever advance side by side. We are glad to know that the Royal Society, of which Lord Tennyson has been for many years a Fellow, was fittingly represented at his funeral by its President and officers.

We regret to announce the sudden death of Mr. Robert Bullen, the curator of the Glasgow Botanic Gardens. He was well known as a horticulturist, being especially successful in the cultivation of orchids. The post vacated by his death is one of the best of the kind in the country, and we understand that the appointment will rest with the Corporation of Glasgow, who took over the management of the Botanic Gardens in 1891.

The death of Dr. Léon Poincaré, professor in the Faculty of Medicine at Nancy, is announced. He died on September 15 at the age of sixty-four.

At the meeting of the Linnæan Society of New South Wales on August 31, Mr. H. Deane, Vice-President, who occupied the chair, referred to the loss the Society had sustained by the death of Mr. R. D. Fitzgerald, well known for his knowledge, and for his artistic delineations, of Australian orchids.

Russia, which already possesses some of the best equipped chemical laboratories in Europe, is to have another which is to eclipse all others. On September 13/25 the foundation stone of the new chemical laboratory of the University of St. Petersburg was laid with befitting ceremony. The new laboratory, which is designed by Prof. Mentschatkin in collaboration with the architect Krassowsky, is based upon the best existing models in Germany and Austria.

In the *Times* of the 10th inst. there is an announcement that Surgeon-Major Laurie has proved that the fall of blood-pressure in animals rendered insensible by chloroform is due to the action of the anæsthetic on the brain, and not on the heart. When blood containing chloroform is allowed to reach the brain only all the ordinary phenomena of anæsthesia are observed, but when such blood is conveyed to every other part of the body except the brain, which, by a peculiar arrangement of the experiment, is supplied with pure blood, the anæsthetic effects of chloroform and also its depressing effects on the circulation are not observed. We are glad to see that Dr. Laurie is still continuing his experiments on a subject of such vital interest, and we trust that his energy and the generosity of the Nizam, to which we owe the elaborate work of the Hyderabad Chloroform Commission, will meet an ample reward.

The British Ornithologists' Union, founded in 1858, consists of upwards of 250 votaries of this branch of natural history, who maintain as their organ the well-known ornithological journal, *The Ibis*, now in its thirty-fourth volume. The more active members of the union have just formed themselves into a club, and will meet together once a month to read and discuss papers and to exhibit specimens. The first meeting of the "British Ornithologists' Club" will be held on October 19. Mr. Howard Saunders, F.Z.S., is the treasurer and secretary.

The university of Padua is about to hold a festival in honour of Galileo. The seventh of December, 1892, will be the tercentenary of the day upon which Galileo ascended the chair of mathematics at that university. In the words of the letter of invitation which the rector, Prof. Carolus Ferraris, has just issued to some of the learned societies of Europe, "Illo enim die Ann. mdxcii. summus acerrimusque investigator legum, quibus caelestium terrestriumque rerum natura continetur, hic cathedram ascendit eamque voce sua immortalitati commendavit." It is to the honour of Padua that it welcomed Galileo to this high position the very next year after he had been publicly hissed and obliged to resign his professorship at Pisa. The festival will extend from the 6th to the 8th of next December.

The Linnæan Society of New South Wales has just issued a second circular with respect to the Macleay Memorial Volume by which it appears that only £170 has been contributed out of £400 which is required for the publication of the Memorial Volume. The circular calls to mind Sir William Macleay's contributions to science, in purchasing and fitting out at his sole expense the ship *Chevert* and exploring the island of New Guinea, and in presenting to the University of Sydney his entire collection valued at £23,000, together with £6000 to provide salary for a curator. Sir William Macleay was also the founder of the Linnæan Society of New South Wales, for which he erected a suitable building, and which he endowed with the sum of £20,000. He further founded a chair of bacteriology and four scientific fellowships at the University of Sydney, at a cost altogether of £47,000. The sum of £170 seems hardly adequate as a recognition of these munificent gifts to science, to say nothing of the original researches which Macleay himself conducted.

Mr. Thomas Hodgkins, of Long Island, New York, has sent to the Royal Institution no less than £20,000 for the promotion of scientific research. Not very long ago, as we noted at the time, Mr. Hodgkins presented £40,000 to the Smithsonian Institution at Washington.

The Severn Valley Field Club has completed the work of the current year. It has paid some attention to the glacial deposits at Gloppa, near Oswestry, which have recently yielded to Mr. A. C. Nicolson a large series of fossils. The members have also visited the Triassic rocks of the area round Warwick. Their work concluded with an investigation of the Uriconian and Longmyndian formations of Western Shropshire under the guidance of the President, Dr. C. Calloway.

Dr. J. M. Macfarlane has been appointed to the chair of Biology in the University of Pennsylvania, Philadelphia. He formerly held the post of senior assistant in the Botanical Department of the University of Edinburgh.

An influential association has been formed for the promotion of the study of the Hausa language and people, in commemoration of the services of the Rev. J. A. Robinson, who died last year at his work as a missionary in the Niger Territories. Hausa is the *lingua franca* of the Central Sudan, extending from the Sahara to the tribes near the Gulf of Guinea, and from the Egyptian Sudan to the French colony of Senegal. Mr. Robinson convinced himself that no satisfactory work of any kind could be carried on among the races of the Central Sudan without a knowledge of Hausa. The Executive Committee of the new Association have decided to endeavour, with the least practicable delay, to appoint two "Robinson Students," conversant with Arabic or Hebrew, whose preliminary labours would be carried on in the comparatively temperate climate of Tripoli, with a view to their proceeding at a later date to the Central Sudan, where they would make the language and customs of the Hausas subjects of careful study. All scientific observations collected by these students during their residence in Africa will be sent to the Association for distribution to the appropriate societies.

THE Association of American Agricultural Colleges and Experiment Stations will hold its sixth annual convention at New Orleans on November 15. The different subjects assigned to station workers for the Columbian Exhibition will be discussed.

PROF. H. MARSHALL WARD, F.R.S., of the Royal Engineering College, Cooper's Hill, will give a course of ten lectures at University College, London, on "The Morphology and Physiology of Fungi and Schizomycetes." The course will begin on Thursday, October 13, at 3 p.m., and be continued at the same time each week till Christmas.

A LARGE plant of *Fourcroya* is now in flower in the conservatory of the Royal Botanic Society. The secretary of the Society referred to it at the meeting of the Council on Saturday last. The plant is sometimes called the century plant, the idea being that it flowers only once in a hundred years. In reality the flower is produced only once in the life of the plant, the duration or term of life varying considerably, according to the treatment the plants individually receive. Specimens of the *Agave Americana* have flowered in the Royal Botanic Society's garden, the ages of them being well authenticated as over 80 years; but the plant is known to flower in warmer climes before twenty years of age. The present specimen of *Fourcroya* is between twenty and thirty years old. It began on August 1 last to produce its flower spike, which, although the plant is slow growing generally, developed at a rapid pace, so that on September 15 the tip had reached the glass roof. A square of glass being removed, the flower spike continued its growth, and it is now some 3 feet or 4 feet above the ridge, a total of over 30 feet in height. The leaves vary from 6 feet to 7 feet in length.

IN his treatise, "On the Propagation of Electric Force," Prof. Hertz mentions some experiments tending to prove that the production of resonance and the period of oscillation in resonators are not influenced by the specific resistance or the magnetic properties of the secondary conductor. But if the phenomena be observed electrometrically, the individual properties of the metals soon show themselves. This method was employed by Mr. V. Bjerknes, of the University of Christiania, who gives an account of his results in No. 9 of *Wiedemann's Annalen*. Experiments made with copper, brass, German silver, platinum, nickel, and iron show that metals have different powers of absorbing the energy of electric waves. The rate of absorption increases with the resistance and with magnetization of the metal. Iron and nickel were able to follow the oscillations to a certain extent, which means that their magnetization was actually reversed one hundred million times per second.

A method of exhibiting the Hertzian oscillations to a large audience is described in the same number by Mr. L. Zehnder, of the University of Freiburg. The two conducting rods placed in the focal line of the concave mirror are connected with a Geissler tube, within which the ends are placed very closely together, but so that a discharge produces not a spark but a general luminosity inside the tube. The secondary Hertz effects are too feeble to be visible except at a very short distance and in a darkened room. In this case they are augmented by a kind of relay. On either side of the terminals of the resonator are two other terminals from a circuit of 600 secondary cells, which can be regulated so that the current is just unable to traverse the distance between the terminals. As soon, however, as the resonator responds to electric oscillations, the relay is brought into action, and a brilliant discharge takes place. In cases where such a large accumulator is not available, it is possible to work with another inductorium, or, still better, to obtain the oscillating current from the primary coil by bringing one end of a wire into its neighbourhood, the other being led to earth. By such means it is possible to exhibit the phenomena in question without even darkening the room.

THE weather during the first part of the past week was very boisterous and inclement over the whole of these islands. Between Thursday, the 6th inst., and Monday last, two deep depressions closely following each other passed over the country from off the Atlantic, and heavy gales were experienced in all parts of the United Kingdom, accompanied by much rainfall, while thunderstorms and hail occurred in many places. The sea also was exceptionally rough, especially on our north-west coasts, and caused much damage on shore. Temperature was somewhat low for the time of year, the daily maxima rarely reaching 60° in any part, while the nights were very cold. As the depressions passed to the eastward the weather cleared and the temperature decreased considerably, sharp frost occurring on the ground over the inland parts of England. Towards the close of the period the type of weather was becoming more settled in character than it had been for some time past, but on Tuesday a depression lay over the Bay of Biscay, which might disturb our conditions. The *Weekly Weather Report* of the 8th inst. showed that during that week the rainfall exceeded the mean in all districts except the south of Ireland, and that temperature was from 2° to 4° below the mean, the lowest of the minima ranging from 32° to 38°. The only district in which bright sunshine exceeded the mean was the Channel Islands; the percentage of the possible duration amounted there to 40, while it was only 8 in the north of Scotland.

THE Meteorological Council have published the hourly means obtained from their self-recording instruments at four observatories for the year 1889, for periods of five days, calendar months, and for the year, while means of pressure and temperature and totals of rainfall are also given for every day. This is the third year in which the observations have been published in this form, instead of the actual hourly values, as formerly, and an addition has been made by including the monthly and yearly mean values of the daily maximum and minimum temperatures for this and the two previous years in this volume. The work contains 112 quarto pages of very clearly drawn-up tables.

MR. H. DEVAUX has been making interesting experiments on the sense of taste in ants. Among other results he has found that *Lasius flavus*, while fond of sugar, dislikes saccharine. The ants swarmed around sugar laid out for them, but turned away from saccharine as soon as they tasted it. Even sugar became unpleasant to them when it was mixed with saccharine. It seems, therefore, that sweetness is not the only quality which attracts them to sugar.

PROF. SCOTT has a note in the new volume of "the Transactions and Proceedings" of the New Zealand Institute, on the occurrence of cancer in fish. The fish afflicted with this disease were all specimens of the American brook-trout (*Salmo fontinalis*) kept in confinement in one of the ponds at Opoho belonging to the Dunedin Acclimatisation Society. Males and females were alike affected, and the diseased fish never recovered. Prof. Scott has been able to examine several specimens showing the disease in various stages of advancement, and gives in his paper a short account of the naked-eye and microscopic appearances of the growth. The occurrence of cancer in the lower animals has been frequently observed of late years, and it is by no means so rare among them as it was at one time thought to be. Prof. Scott does not, however, know that it has ever before been noted in fish.

IN his report as surgeon-naturalist of the Marine Survey of India, to which we referred last week, Dr. A. Alcock records some interesting observations on the little estuarine crab *Gelasimus*. The most obvious structural peculiarity of *Gelasimus* is the enormous development of one of the chelæ in the male only, the chelæ in the female being minute. The species observed by Dr. Alcock was *Gelasimus annulipes*, Edw. This species lives in vast swarms in "warrens" on the muddy tidal swamps of the Godávari and Kistna, each individual having its own burrow, round which it ranges, and into which it retreats when alarmed. In the colder months, at any rate, the males far outnumber the females. In a fully adult male the length of the large chela is two-and-a-half times the greatest length, and one-and-a-half times the greatest breadth, of the whole body, and 40 per cent. of the entire weight of the animal, and is coloured a beautiful cherry-red fading to a rose pink, the rest of the animal being of a dingy greenish-brown colour. Dr. Alcock has been able to observe that, whatever other functions the great chela may serve, it also, in the species under consideration, is (1) a club used in the contests of rival males, and (2) a signal to charm and allure the females. This last function is particularly apparent. As one walks across the mud one first becomes aware of the presence of these crabs by noticing that the surface of the mud is everywhere alive with twinkling objects of a brilliant pearly-pink colour. Carefully watched, these prove to be the enormous chelæ of a crowd of males of *Gelasimus* waving in the air, each little crab standing at the mouth of its burrow and ceaselessly brandishing its big claw. On closer observation, among every ten or so males a small clawless female may be seen feeding in apparent unconcern. If the female should approach the burrow of a male, the latter displays the greatest excitement, raising itself on its hindmost legs, dancing and stamping, and frantically waving its beautifully-coloured big claw. From prolonged watching, Dr. Alcock feels convinced that the waving of the claw by the male is a signal of entreaty to the female, and he thinks that no one can doubt that the claw of the male has become conspicuous and beautiful in order to attract and charm the female. The second function, as a fighting weapon, becomes apparent when in the general tournament one of the rival males approaches too close to another. The great claw is then used as a club, the little creatures making savage back-handed sweeps at each other.

AN excellent paper on fungous diseases and their remedies was read lately by Prof. J. E. Humphrey before the Massachusetts Horticultural Society, and has now been printed. One of the principles on which he insists is that the treatment of these diseases, to be efficient, must be preventive rather than remedial. He points out that it is not enough to take care that plants shall have abundant nourishment. No practice, he says, is more common among American fruit growers than to leave in the vinery and the orchard, lying on the ground or hanging from the branches, the dead fruits of the season, which have been rendered worthless by fungi. Nothing could produce more unhealthful conditions, for these dead fruits commonly furnish to the fungi which attack them precisely the most favourable soil for further and complete development. In the next spring the air is full of the spores of these fungi, which find lodgment on the new leaves and fruits of the very plants on which they grew last year; and so the story goes, year after year. "In a word," says Prof. Humphrey, "keep your orchards and gardens and greenhouses *clean*. Allow no rubbish to be about on which fungi can breed. Remove and destroy all diseased fruits or plants as scrupulously as you preserve saleable ones, and you will have more saleable ones to preserve. It is surprising how far generous culture and clean culture will go toward preventing fungous diseases, without special treatment."

THE Marquis de Nadaillay contributes to *Science* (Sept. 23) an interesting account of the various discoveries which have been made in the caves of Baoussé Rousse, between Mentone and Ventimiglia. The caves were found in 1872 by M. Rivière, who has since vigorously prosecuted his excavations. These have yielded many human skeletons, all belonging to the Cro-Magnon race. They are robust, and bespeak an athletic constitution and great muscular power. The men were remarkably tall, the crania are dolichocephalic, and the tibias platycnemic. The bones of all the adults, after the total decomposition of the flesh, were painted red with the help of peroxide of manganese or other substances frequently met with in the caves: a custom which the Marquis de Nadaillay believes prevails, or till lately prevailed, among some Indian tribes. Much attention has been devoted to the latest discovery, made early in the present year, of three skeletons—a man, a woman, and a "young subject," whose wisdom teeth had not been developed. They were found eight metres below the ground, and had been buried on a bed of cinders, broken fragments of charcoal, and remains of all sorts, evidently the hearth on which the family cooked their victuals. The boy wore a necklace formed of two rows of the vertebræ of a fish and one row of small shells. At different points hung pendants cut out of the canine teeth of stags, decorated with parallel striæ. The man had also a necklace of fourteen canines of the stag, also striated. With the skeletons were found stone instruments, some of them finely worked, but none of them polished, and some bone implements of very rude fabrication. The man was very tall. If we judge by the length of his thigh-bone, his height must have exceeded six feet six inches. The teeth even of the boy were very much worn; those of the man were worn to the roots. The bones of many mammals have been found, but none belonging to extinct species, or even to the reindeer. On the other hand, no polished stone implement has been discovered. The remains, therefore, must be ascribed to the end of the quaternary or the beginning of the neolithic times. One cave is still unexcavated. The Prince of Monaco, whose property it is, has given orders that the excavations are to begin next spring.

MR. C. HEDLEY read before the Linnæan Society of New South Wales, on August 31, a paper in which he presented an interesting study of ancient geography. The immediate subject was the range of *Placostylus*. He remarked on the essential unity of the *Placostylus* area as a zoological province, embracing the archipelagoes of Solomon, Fiji, Hebrides, Loyalty, New Caledonia, Norfolk Island (?), Lord Howe, and New Zealand; a unity explicable only on the theory that they form portions of a shattered continent, and are connected by shallow banks formerly dry land. Deep sea soundings, especially those of the *Challenger* in the Coral Sea, further demonstrate the existence of such a submarine plateau, for which the name of "The Melanesian Plateau" is proposed. Further, Mr. Hedley contended that the Melanesian Plateau was never connected with, nor was ever populated from, Australia; that its fauna and flora were originally derived from New Guinea.

In the *Proceedings* of the U.S. National Museum (vol. xv.), Lieut. Dix Bolles calls attention to an interesting object included in a collection of ethnological specimens given by him to the museum in 1883-85. This is a wooden mask, which has for its eyes two large bronze Chinese coins. The grave from which the mask was taken is near the Chilcat village, at the mouth of the Chilcat River, Alaska, where stands a row of six grave-houses on a narrow strip of land close to the river, with a swamp behind them. From this particular grave very little was obtained by the explorers, its contents having nearly all rotted away. Lieut. Bolles was told by the natives that it was the grave of a medicine man who had flourished more than 200 years before, six successors having filled his office, each one living to a good old age. Careful questioning failed to evoke any other answer. When the coins were shown to the Chilcats, they could not remember having ever seen such objects. Lieut. Bolles concludes that the coins probably were derived from a junk driven on the coast about two centuries ago. "To those," he says, "who doubt the advent of junks on the west coast at this early date, these facts will probably not be satisfactory, but it will be necessary for them to break down by direct evidence such a strong plea."

Messrs. H. Alabaster, Gatehouse & Co. have now in the press, shortly to be issued, a new work, entitled, "Domestic Electric Lighting, treated from the Consumer's Standpoint." The author is Mr. Ed. C. de Segundo.

"The Electrician" Printing and Publishing Co., Limited, have in preparation for their "Electrician" Series the following volumes:—"Electromagnetic Theory," by Oliver Heaviside; "Electrical Engineering Formulæ, &c.", by W. Geipel and H. Kilgour; "Submarine Cable Laying and Repairing," by H. D. Wilkinson; "Drum Armature Winding and Commutators: in Theory and Practice," by F. M. Weymouth; and "Electricity as a Motive Power," by Albion T. Snell, M.I.C.E., M.E.

The first series of lectures given by the Sunday Lecture Society begins on Sunday afternoon, October 23, in St. George's Hall, Langham Place, at 4 p.m., when Dr. Andrew Wilson will lecture on "The Distribution of Animals and what it teaches." Lectures will subsequently be given by Mr. Willmott Dixon; Prince Kropotkin; Mr. R. Brundenell Carter; Mr. Arthur W. Clayden; Prof. H. Marshall Ward, F.R.S.; and Dr. E. E. Klein, F.R.S.

Another memoir upon persulphuric acid and the persulphates is contributed by M. Berthelot to the *Annales de Chimie et de Physique.* As described in our note of vol. xliv., p. 577, the potassium, ammonium, and barium salts of this interesting acid were obtained last year by Dr. Marshall, of Edinburgh, in tolerably large quantity and in well-developed crystals. M. Berthelot, to whom the honour of the first preparation of persulphuric acid and its anhydride is due, now publishes his further work upon the subject, fully confirming Dr. Marshall's results, and adding a few more facts to our knowledge of the acid and its salts. The form of electrolysis apparatus which has been found by M. Berthelot to yield the best results consists of a double cell, the inner vessel of which is constructed of porous porcelain. The liquid contents of both the interior and exterior vessels are cooled by means of glass worms through which a constant current of cold water is maintained. The inner cell of 150 c.c. capacity contains a concentrated solution of potassium or ammonium sulphate, according as potassium or ammonium persulphate is required, in sulphuric acid diluted with six or seven times its volume of water. The nearer the composition of this liquid approaches to that of a solution of bisulphate of potassium or ammonium, the greater is the yield of persulphate. The exterior cell is simply filled with dilute sulphuric acid. The positive pole in the interior cell is most advantageously formed by a stout platinum wire, about one millimetre in diameter, as persulphuric acid is found by M. Berthelot to be rapidly decomposed in contact with a large surface of platinum. Platinum sponge, indeed, instantly decomposes the acid or solutions of its salts. The negative pole in the outer cell may conveniently take the form of a large plate of platinum. The current employed was one of three amperes derived from accumulators. At the expiration of fifteen to twenty hours the internal cell is found to contain large quantities of beautiful crystals of the persulphate. The usual yield of the potassium salt was 20-25 grams, and of the more soluble ammonium salt as much as 40-45 grams, in one operation. M. Berthelot has also obtained potassium persulphate by the direct electrolysis of sulphuric acid and subsequent addition to the product of a concentrated solution of potassium bisulphate, crystals of potassium persulphate, KSO_4, being at once deposited. This mode of preparation is not so advantageous as the method of production by the electrolysis of potassium sulphate as above, but affords interesting proof of the formation of free persulphuric acid by the electrolysis of oil of vitriol. M. Berthelot has further succeeded in preparing persulphuric acid by the gradual addition of anhydrous barium peroxide to concentrated sulphuric acid in a small flask surrounded by ice. So rapid is the action that if the addition of the peroxide is continued until the sulphuric acid is almost exhausted, even although the vessel is maintained in pounded ice, dense vapours are evolved which possess the remarkable odour and other properties of persulphuric anhydride. Another interesting fact observed by M. Berthelot is that a solution of potassium persulphate attacks mercury, even at the ordinary temperature, with production of a yellow basic sulphate which appears to be identical with the salt known since the times of the alchemists as *turpith mineral.*

The additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Miss E. A. Hill; two Racoons (*Procyon lotor*) from North America, presented by Captain Sharp; a grey Ichneumon (*Herpestes griseus*) from India, presented by Mrs. Wyndham Bewes; a Stanleyan Chevrotain (*Tragulus stanleyanus*) from Java, presented by Mr. Chas. J. Noble; a Vulpine Phalanger (*Phalangista vulpina*, ♂) from Australia, presented by Master H. H. Barret; a White Stork (*Ciconia alba*), European, presented by Sir H. Rae-Reid, Bart., F.Z.S.; an Ostrich (*Struthio camelus*, ♂) from Africa, presented by H.M. the Queen; a Common Chameleon (*Chamæleon vulgaris*) from North Africa, presented by Mrs. Davidson; three Negro Tamarins (*Midas ursulus*) from Guiana; a Canarian Laurel Pigeon (*Columba laurivora*, ♂) from the island of Gomera, Canary Islands; two Nicobar Pigeons (*Colænas nicobarica*) from the Indian Archipelago, deposited; an Indian Muntjac (*Cervulus muntjac*, ♀) from India; four Ringed Plovers (*Ægialitis hiaticula*) and two Dunlins (*Tringa alpina*), British, purchased.

OUR ASTRONOMICAL COLUMN.

Luminous Night Clouds.—In an article communicated to *Astronomische Nachrichten*, No. 3120, Herren W. Foerster and O. Jesse invite astronomers and geophysicists both here and abroad to make observations of the very interesting phenomena of luminous night clouds, the appearance of which has, up till now, been observed more or less only at Berlin. Since the year 1885, the authors tell us, these appearances have been most noticeable, and it is because they are now becoming less so that they wish to have as many observations made as possible. The phenomenon appears in the form of cirrus clouds, which stand out bright against the twilight sky. The colour generally noticed is that of a bluish white, and when the horizon is approached, gold and red tints are added. The best time for observation is said to be just before and after sunrise and sunset. From photographs taken at Berlin, it has been computed that these clouds are at a height of 82 kilometres. Long after the sun has set they are seen to reflect the sunlight, but as soon as they fall within the reach of the earth's shadow they immediately become invisible. The observations show, so far as may be judged from those already at hand, that the movements of this phenomenon after midnight are directed from the north-east ± 40°, and the authors think it highly probable that the resistance of the medium surrounding the earth accounts for these movements. This is to a certain extent affirmed by observations made at Punta Arenas and other places, the phenomena occurring six months after the conclusion of the Berlin observations. The authors suggest that eye observations